

CLAIMS

What is claimed is:

1. A turbine engine comprising:

a compressor section;

5 a turbine section;

a circumferential array of combustion chamber conduits, the conduits being downstream of the compressor section and upstream of the turbine section and having first and second ports; and

10 means for directing oxygen-containing gas from the compressor section to the combustion chamber conduits so as to cyclically:

feed a charge of said gas into each of the conduits through the first port of such conduit; and

15 permit discharge of products of combustion of said charge and a fuel through said first port and said second port.

2. The engine of claim 1 further comprising:

20 means for directing said products of combustion of said charge from said first port and said second port to said turbine section and mixing said products with a flow from the compressor bypassing the combustion chamber conduits so as to present the turbine section with a circumferentially uniform
25 flow.

3. The engine of claim 1 wherein:

the circumferential array of combustion chamber conduits is rotating about an engine axis; and

30 the means for directing comprises at least a first portion non-rotating about the engine axis.

4. The engine of claim 3 wherein said turbine and compressor sections each comprise high and low stages on respective high

and low spools and the circumferential array of combustion chamber conduits is on a free spool.

5. The engine of claim 4 wherein a final stage of the compressor section is on said free spool.

6. The engine of claim 3 wherein the array is on a free spool and rotation of the array is driven by partially tangential direction of the products of combustion.

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7. The engine of claim 1 wherein there is a first airflow substantially through said compressor and turbine sections and wherein a first portion of the first airflow passes through the combustion chamber conduits in the charges and a second portion of the first airflow bypasses combustion and a mass flow ratio of the first portion to the second portion is between 1:1 and 1:3.

8. The engine of claim 7 wherein the engine is a turbofan and the first airflow is a core airflow and a bypass airflow bypasses the compressor and turbine sections.

9. The engine of claim 1 wherein said combustion comprises detonation.

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10. The engine of claim 1 further comprising a plurality of igniters, each of which is positioned relative to an associated one of the conduits to ignite the combustion of the charge in said associated conduit.

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11. A turbofan engine comprising:

a fan;

a compressor having;

a turbine coaxial with the compressor along an axis and

35 driving the compressor and fan;

a pulsed combustion combustor receiving air from the compressor and outputting combustion gasses to the turbine and having:

a plurality of combustion chamber conduits each
5 extending along a length between first and second ends
and having an outboard portion proximate the first end
and an inboard portion proximate the second end and held
for rotation about the axis through a plurality of
positions, including:

10 at least one charge-receiving position for
receiving a charge from upstream;

at least one initiation position for initiating
combustion of the charge; and

15 at least one discharge position for downstream
discharging of products of combustion of said
charge.

12. The engine of claim 11 wherein:

20 the charge is received through the outboard portion and
partially passes therefrom into the inboard portion; and

the combustion products are discharged partially through
the first end and partially through the second end.

13. The engine of claim 11 wherein:

25 the inboard portion has a partially tangential
orientation at the second end.

14. The engine of claim 11 further comprising at least one
fuel injector for injecting fuel into air from the compressor
30 to form the charges.

15. The engine of claim 11 further comprising at least one
ring of foils rotating with the conduits as a unit.

35 16. A pulsed combustion device comprising:

first means for receiving an air flow moving at least partially in a first axial direction and redirecting the flow to move at least partially in a second axial direction, opposite said first axial direction; and

5 a combustor assembly comprising:

a plurality of combustion conduits in a circumferential array, the array rotatable about the axis relative to at least a portion of the first means, each of said conduits having:

10 a first port; and

a second port, the first port cyclically receiving a charge of said airflow and a fuel and the first and second ports cyclically discharging combustion products of the charge; and

15 at least one ignition means positioned to initiate said combustion.

17. The device of claim 16 in a turbine engine further comprising:

20 a compressor upstream of the pulsed combustion device; and

a turbine downstream of the pulsed combustion device.